

What is claimed is:

1. An image processing system comprising:

a plurality of image projection means for projecting images based on image  
5 signals so that the images projected by the plurality of image projection means are  
displayed in a manner to overlap one another on a projection target area, the image  
projection means being disposed at different positions;

sensing means for sensing a predetermined image projected by each of the  
plurality of image projection means and generating sensing information;

10 overlap-area detecting means for detecting projection areas, each of the  
projection areas indicating a region in which the predetermined image is displayed in an  
sensing region of the sensing means and for detecting an overlap area at which the  
projection areas overlap one another, based on the sensing information;

correction information generating means for generating correction information  
15 which indicates information for positions of the projection areas and a position of the  
overlap area; and

projection area correction means for correcting image signals inputted into the  
plurality of image projection means, based on the correction information, so that an  
image is projected onto a region in the projection target area corresponding to the  
20 overlap area.

2. The image processing system as defined in claim 1,

wherein the plurality of image projection means project projection area  
calibration images at different points of time, and

25 wherein the overlap-area detecting means determines a peak position that is a  
brightest position in each of the projection area calibration images that have been sensed,  
based on the sensing information for the projection area calibration images, and detects

the projection areas based on the peak position.

3. The image processing system as defined in claim 2,

wherein the overlap-area detecting means detects the overlap area by adding a  
5 brightness index value of a pixel or a pixel block in each of the projection areas that  
have been detected.

4. The image processing system as defined in claim 1,

wherein the overlap-area detecting means detects a rectangular overlap area  
10 which is the overlap area, aspect ratio of which has been adjusted, and

wherein the correction information generating means generates, as the  
correction information, one of information that indicates positions of four corners in the  
rectangular overlap area and positions of four corners in each of the projection areas,  
information that indicates the positions of the four corners in the rectangular overlap  
15 area, and information that indicates differential values between the positions of the four  
corners in the rectangular overlap area and the positions of the four corners in each of  
the projection areas.

5. The image processing system as defined in claim 1, further  
20 comprising:

a color reproduction means for correcting color and brightness in an image  
based on color reproduction information, in order to reproduce color and brightness of  
an target image,

wherein the plurality of image projection means projects color reproducing  
25 calibration images for correcting the color and brightness of an image in a manner to  
overlap one another onto the region in the projection target area corresponding to the  
overlap area, on condition that the image signals are corrected by the projection area

correction means and an image is projectable onto the region in the projection target area corresponding to the overlap area,

wherein the sensing means senses the color reproducing calibration images that have been projected onto the region in the projection target area corresponding to the  
5 overlap area,

wherein the correction information generating means generates the color reproduction information based on the sensing information for the color reproducing calibration images, and

wherein the color reproduction means corrects the image signals based on the  
10 color reproduction information.

6. An image processing system comprising:

a plurality of image projection sections which project images based on image signals so that the images projected by the image projection sections are displayed in a  
15 manner to overlap one another on a projection target area, the image projection sections being disposed at different positions;

sensing section which senses a predetermined image projected by each of the image projection sections and generates sensing information;

overlap-area detecting section which detects projection areas, each of the  
20 projection areas indicating a region in which the predetermined image is displayed in an sensing region of the sensing section, and detects an overlap area at which the projection areas overlap one another, based on the sensing information;

correction information generating section which generates correction information which indicates information for positions of the projection areas and a  
25 position of the overlap area; and

projection area correction section which corrects image signals inputted into the image projection sections, based on the correction information, so that an image is

projected onto a region in the projection target area corresponding to the overlap area.

7. A projector comprising:

5 image projection means for projecting an image based on image signals to display the image in a manner to overlap another image projected from another projector at a projection target area, the image projection means being disposed at a different position from a position in which the other projector is disposed;

sensing means for sensing a predetermined image projected onto the projection target area and generating sensing information;

10 overlap-area detecting means for detecting projection areas, each of the projection areas indicating a region in which the predetermined image is displayed in an sensing region of the sensing means and for detecting an overlap area at which the projection areas for the projector and the other projector overlap, based on the sensing information;

15 correction information generating means for generating correction information which indicates information for positions of the projection areas and a position of the overlap area; and

20 projection area correction means for correcting image signals, based on the correction information, to project an image onto a region in the projection target area corresponding to the overlap area.

8. A projector comprising:

25 an image projection section which projects an image based on image signals to display the image in a manner to overlap another image projected from another projector at a projection target area, the image projection section being disposed at a different position from a position in which the other projector is disposed;

sensing section which senses a predetermined image projected onto the

projection target area and generates sensing information;

overlap-area detecting section which detects projection areas, each of the projection areas indicating a region in which the predetermined image is displayed in an sensing region of the sensing section, and detects an overlap area at which the  
5 projection areas for the projector and the other projector overlap, based on the sensing information;

correction information generating section which generates correction information which indicates information for positions of the projection areas and a position of the overlap area; and

10 projection area correction section which corrects image signals, based on the correction information, to project an image onto a region in the projection target area corresponding to the overlap area.

9. A projector comprising:

15 image projection means for projecting an image based on image signals to display the image in a manner to overlap another image projected from another projector at a projection target area, the image projection means being disposed at a different position from a position in which the other projector is disposed;

sensing means for sensing a predetermined image projected onto the projection  
20 target area and generating sensing information;

overlap-area detecting means for detecting projection areas, each of the projection areas indicating a region in which the predetermined image is displayed in an sensing region of the sensing means and for detecting an overlap area at which the projection areas for the projector and the other projector overlap, based on the sensing  
25 information;

correction information generating means for generating correction information which indicates information for positions of the projection areas for the projector and

the other projector and a position of the overlap area;

projection area correction means for correcting image signals, based on the correction information, to project an image onto a region in the projection target area corresponding to the overlap area; and

5 communication means for transmitting the correction information for the other projector to the other projector.

10. A projector comprising:

an image projection section which projects an image based on image signals to  
10 display the image in a manner to overlap another image projected from another projector at a projection target area, the image projection section which being disposed at a different position from a position in which the other projector is disposed;

a sensing section which senses a predetermined image projected onto the projection target area and generates sensing information;

15 an overlap-area detecting section which detects projection areas, each of the projection areas indicating a region in which the predetermined image is displayed in an sensing region of the sensing section, and detects an overlap area at which the projection areas for the projector and the other projector overlap, based on the sensing information;

20 a correction information generating section which generates correction information which indicates information for positions of the projection areas for the projector and the other projector and a position of the overlap area;

a projection area correction section which corrects image signals, based on the correction information, to project an image onto a region in the projection target area  
25 corresponding to the overlap area; and

a communication section which transmits the correction information for the other projector to the other projector.

11. A computer-readable program for causing a computer to function as:

image projection means for projecting an image based on image signals to display the image in a manner to overlap another image projected from another projector at a projection target area, the image projection means being disposed at a different position from a position in which the other projector is disposed;

sensing means for sensing a predetermined image and generating sensing information;

overlap-area detecting means for detecting projection areas, each of the projection areas indicating a region in which the predetermined image is displayed in an sensing region of the sensing means and for detecting an overlap area at which the projection areas for the projector and the other projector overlap, based on the sensing information;

correction information generating means for generating correction information which indicates information for positions of the projection areas and a position of the overlap area; and

projection area correction means for correcting image signals, based on the correction information, to project an image onto a region in the projection target area corresponding to the overlap area.

12. An information storage medium which stores a computer-readable program for causing a computer to function as:

image projection means for projecting an image based on image signals to display the image in a manner to overlap another image projected from another projector at a projection target area, the image projection means being disposed at a different position from a position in which the other projector is disposed;

sensing means for sensing a predetermined image and generating sensing

information;

overlap-area detecting means for detecting projection areas, each of the projection areas indicating a region in which the predetermined image is displayed in an sensing region of the sensing means and for detecting an overlap area at which the  
5 projection areas for the projector and the other projector overlap, based on the sensing information;

correction information generating means for generating correction information which indicates information for positions of the projection areas and a position of the overlap area; and

10 projection area correction means for correcting image signals, based on the correction information, to project an image onto a region in the projection target area corresponding to the overlap area.

13. An image processing method for displaying images from a plurality of  
15 projectors in a manner that the images overlap one another, the method comprising:

projecting projection area calibration images from the projectors onto a projection target area at different points of time using the projectors, at a time of calibration;

sensing the projection area calibration images projected by the projectors and  
20 generating sensing information;

converting sensing information in sensing coordinates into sensing information in projection target area coordinates, based on the sensing information that has been generated;

detecting projection areas based on the sensing information that has been  
25 converted and detecting an overlap area in which the projection areas overlap one another, each of the projection areas indicating a region in the sensing area in which each of the projection area calibration images is projected;



generating correction information which indicates information for positions of the projection areas and a position of the overlap area;

correcting image signals inputted into the projectors based on the correction information, so that an image is projected onto a region in the projection target area  
5 corresponding to the overlap area; and

projecting images by the projectors based on the image signals that have been corrected.

14. The image processing method as defined in claim 13, further  
10 comprising:

determining a peak position that is a brightest position in each of the projection area calibration images that have been sensed, based on the sensing information for the projection area calibration images, and converting sensing information in sensing coordinates into sensing information in projection target area coordinates, based on the  
15 peak position.

15. The image processing method as defined in claim 14, further comprising:

detecting the overlap area by adding a brightness index value of a pixel or a  
20 pixel block in each of the projection areas that have been detected.

16. The image processing method in claim 13, further comprising:

detecting a rectangular overlap area which is the overlap area, aspect ratio of which has been adjusted, and

25 generating, as the correction information, one of information that indicates positions of four corners in the rectangular overlap area and positions of four corners in each of the projection areas, information that indicates the positions of the four corners

in the rectangular overlap area, and information that indicates differential values between the positions of the four corners in the rectangular overlap area and the positions of the four corners in each of the projection areas.